Metal Expands Electrically

Researchers from Karlsruhe Research Centre and University of Saarlandes in Germany, and the Technical University of Graz in Austria have found a way to make metal expand and contract like piezoceramics, which are commonly used as actuators in inkjet printers and auto fuel injection nozzles.

The expanding metal, however requires less voltage than piezoceramics. The researchers made metal expandable by electrically adding or withdrawing electrons from the metal surfaces.

The method works in wet environments, and could eventually be used to power the valves of labs-on-a-chip, or devices immersed in biological fluids in living systems, according to researchers.

Key to the method was gaining a lot of surface area and thus access to more electrons by using clumps made from tiny bits of metal.

The researchers used platinum crystals measuring less than 50nm across to prove it is possible to change the material by injecting or withdrawing electrons.

As they injected electrons, the bonds at the surface of the metal expanded, and when they withdrew electrons the bonds shrunk.

Novel synthesis of silver nanorods and nanofibres

Researchers at the Chinese Academy of Sciences in Beijing report a novel synthesis of silver nanorods and nanofibres through low-intensity ultrasonic treatment of reverse micelles containing silver nitrate and potassium borohydride in the aqueous core. The reverse micelles are formed by adding an aqueous solution of these salts to a solution of sodium bis(2-ethylhexyl) sulfosuccinate (AOT) in isooctane. The chemical reaction of the inorganic salts to form silver particles is restricted to the aqueous core of the reverse micelles. The growth of the particles can be controlled by the size of the aqueous core.

TEM analyses of the silver nanoparticles formed within the reverse micelles indicate only spherical nanoparticles can be obtained in the absence of ultrasonication. In contrast, upon low intensity ultrasonic treatment (240 Hz, 50 W) needle-shaped and wire-shaped nanoparticles are formed, confirmed by UV spectra. This treatment provides a new method of synthesising nanorods and fibres directly from the reverse micelles. Compared to templating, the ultrasonic approach appears simpler and more economical in controlling the size, shape and alignment of nanoparticles.